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Final Response to BDAT Related Comments Document K043-K052, K036, K037. Volume 1-O

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FINAL
RESPONSE TO BDAT RELATED COMMENTS DOCUMENT

K048-K052: Petroleum Refining Industry Wastes
K036: Organophosphorous Wastes (Nonwastewaters)
K037: WW Treatment Sludges from the Production of Disulfoton

VOLUME I-O

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INTRODUCTION

This response to comments document only addresses those comments which were submitted on the proposed land disposal restrictions for those waste codes and general BDAT technologies and issues which relate to Third Third Wastes Treatment Standards.

The commenters presented in this document are grouped according to major concerns of the commenters. This document is comprised of the following sections:

ISSUE CODE 1: General BDAT Aspects
ISSUE CODE 2: D001 - Characteristic Ignitable Wastes
ISSUE CODE 3: D002 - Characteristic Corrosive Wastes
ISSUE CODE 4: D003 - Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
ISSUE CODE 5: D004/D010 - Characteristic Wastes for Arsenic and Selenium and K, P, and U Wastes Containing Arsenic and Selenium
ISSUE CODE 6: D005 - Characteristic Wastes for Barium and P013
ISSUE CODE 7: D006 - Characteristic Wastes for Cadmium
ISSUE CODE 8: D007 - Characteristic Wastes for Chromium
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16. Abstract (Limit: 200 words)

This response to comments document only addresses those comments which were submitted on the proposed land disposal restrictions for those waste codes and general BDAT technologies and issues which relate to Third Third Wastes Treatment Standards.

The commenters presented in this document are grouped according to major concerns of the commenters.

17. Document Analysis a. Descriptors

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OPTIONAL FORM 272 (4-77)
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ISSUE CODE 24: K011/K013/K014 - Acrylonitrile

ISSUE CODE 25: K015 - Still Bottoms from Benzal Chloride

ISSUE CODE 26: K021 - Spent Antimony Catalyst.

(No Comments Were Received for this Waste Code)

ISSUE CODE 27: K046 - WW Treatment Sludges from Manufacturing, Formulating, and Loading of Lead-Based Initiating Compounds

ISSUE CODE 28: K060 - Ammonia Still Lime Sludge.

(No Comments Were Received for this Waste Code)

ISSUE CODE 29: K061 - Electric Arc Furnace Dust

ISSUE CODE 30: K069 - Emission Control Dust/Sludge from Secondary Lead Smelting

ISSUE CODE 31: K071, K106 - Mercury Cell Process Wastes

ISSUE CODE 32: K073 - Chlorinated Hydrocarbon Wastes.

(No Comments Were Received for this Waste Code)

ISSUE CODE 33: K086 - Residues from Ink Formulation

ISSUE CODE 34: K100 - Waste Leaching Solution from Acid Leaching of Emission Control Dust/Sludge from Secondary Lead Smelting

(No Comments Were Received for this Waste Code)

ISSUE CODE 35: Wastes Containing Cyanide

ISSUE CODE 36: K017 - Wastes from the production of Epichlorohydrin

(No Comments Were Received for this Waste Code)

ISSUE CODE 37: K028,K029, K095, K096 - Production of 1,1,1-Trichloroethane

ISSUE CODE 38: Wastewaters containing BDAT Constituents

ISSUE CODE 39: K022 - Wastes from the Production of Phenol/Acetone

ISSUE CODE 40: K025 - Distillation Bottoms from the Production of Nitrobenzene

ISSUE CODE 41: K035 - WW Treatment Sludges from the Production of Creosote

ISSUE CODE 42: K026 - Stripping Still Tails from the Production of Methyl Ethyl Pyridine

(No Comments Were Received for this Waste Code)

ISSUE CODE 43: K083 - Distillation Bottoms from the Production of Aniline

ISSUE CODE 44: Oxygenated Hydrocarbons and Heterocyclic U and P Wastes

ISSUE CODE 45: F024 - Production of Chlorinated Aliphatic Hydrocarbons

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(No Comments Were Received for this Waste Code)

ISSUE CODE 50: K037

(No Comments Were Received for this Waste Code)

ISSUE CODE 51: Leachates

ISSUE CODE 52: Gases

Commenters are identified by both commenter number and commenter name. Comments within each section of this document have been assigned a sequential comment number.

Issues were obtained from the original comment submittal and were categorized based on the grouping specified above. The Agency's response to each comment follows immediately after the text of the document. For responses related to capacity issues, the reader should review the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume II Capacity Related Comments." For information regarding broad policy questions, the reader is directed to the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume III Policy Related Comments."

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No Comments Were Received for this Waste Code

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ISSUE CODE 50: K037

No Comments Were Received for this Waste Code

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WOOD RIVER REFINERY FILTER CAKE (K048/K051)

CONSTITUENT	Feed As Received	Product* (Dry)	Revised BDAT Treat Standard 11/17/89
Total Petroleum Hydrocarbon, %	10	0.3	
Water Content, %	35	0	
Solids, %	55	99.7	
Volatiles, mg/kg			
Benzene	5	<4.5	3.9
Toluene	79	<4.5	3.9
Ethylbenzene	93	<4.5	0.08
Xylene	230	<9	8.5
Semi-volatiles, mg/kg			
Naphthalene	62	<0.5	0.84
Anthracene	18	0.8	1.4
Phenanthrene	91	(1.3)	0.84
Benzo(A)anthracene	<5.4	<0.5	1.4
Pyrene	12	0.6	1.1
Chrysene	<5.4	<0.5	0.84
Benzo(A)pyrene	<5.4	<0.5	1.4
Phenol	<200	<0.1	4.3
O-Cresol	<195	<0.2	6.8
P-Cresol	<190	<0.3	6.8
Bis (2-ethylhexyl) phthalate	NA	NA	4.3
Di-n-butyl phthalate	NA	NA	4.3
Total Cyanide, mg/kg	3.5	(4.6)	1.8
Total Metals, mg/kg			
Silver	<0.5	<1	
Arsenic	<25	<50	
Barium	130	210	
Cadmium	4	8	
Chromium	1700	3100	
Mercury	<5	<10	
Nickel	86	140	
Lead	23	42	
Selenium	<30	<50	
TCLP, mg/l (Final raffinate only)			
Total Chromium		0.1	1.7
Arsenic		0.005	0.004
Nickel		(0.39)	0.048
Selenium		0.015	0.025

<X.X - Analytical confidence limit, RCC did not report values below this limit
NA - Not analyzed for
* - After six washes in laboratory bench scale testing
( ) - Analysis exceeds treatment standard

cont.

48 - Did - 1

TABLE 8. SHELL OIL COMPANY - AMINE EXTRACTION TESTS
DEER PARK REFINERY CPI SEPARATOR BOTTOMS (K051)

CONSTITUENT	Feed As Received	Product* (Dry)	Revised BDAT Treat Standard 11/17/89
Total Petroleum Hydrocarbon, %	9	0.3	
Water Content, %	54	0	
Solids, %	37	99.7	
Volatiles, mg/kg			
Benzene	160	<4.5	3.9
Toluene	410	7.1	3.9
Ethylbenzene	180	<4.5	0.08
Xylene	1300	15	8.5
Semi-volatiles, mg/kg			
Naphthalene	24	<0.5	0.84
Anthracene	13	0.8	1.4
Phenanthrene	34	1.3	0.84
Benzo(A)anthracene	<7.9	<0.5	1.4
Pyrene	11	0.6	1.1
Chrysene	<7.9	<0.5	0.84
Benzo(A)pyrene	<7.9	<0.5	1.4
Phenol	<150	<0.1	4.3
O-Cresol	<70	<0.2	6.8
P-Cresol	<30	<0.3	6.8
Bis (2-ethylhexyl) phthalate	NA	NA	4.3
Di-n-butyl phthalate	NA	NA	4.3
Total Cyanide, mg/kg	0.6	1.1	1.8
Total Metals, mg/kg			
Silver	<0.5	<1	
Arsenic	<20	<50	
Barium	210	500	
Cadmium	5.8	13	
Chromium	1900	7500	
Mercury	<4	<10	
Nickel	50	130	
Lead	210	470	
Selenium	<20	<50	
TCLP, mg/l (Final raffinate only)			
Total Chromium		0.1	1.7
Arsenic		0.003	0.004
Nickel		0.27	0.048
Selenium		0.034	0.025

<X.X - Analytical confidence limit, RCC did not report values below this limit
NA - Not analyzed for
* - After six washes in laboratory bench scale testing
( ) - Analysis exceeds treatment standard

cont.

TABLE 7. SHELL OIL COMPANY - AMINE EXTRACTION TESTS
MARTINEZ REFINERY API SEPARATOR BOTTOMS (K051)

CONSTITUENT	Feed As Received	Product* (Dry)	Revised BDAT Treat Standard 11/17/89
Total Petroleum Hydrocarbon, %	26	0.3	
Water Content, %	67	0	
Solids, %	7	99.7	
Volatiles, mg/kg			
Benzene	60	<8	3.9
Toluene	650	<8	3.9
Ethylbenzene	550	<8	0.08
Xylene	3300	<16	8.5
Semi-volatiles, mg/kg			
Naphthalene	105	6.1	0.84
Anthracene	28	6.1	1.4
Phenanthrene	96	10	0.84
Benzo(A)anthracene	<8.1	0.6	1.4
Pyrene	<8.1	1.6	1.1
Chrysene	<8.1	<0.5	0.84
Benzo(A)pyrene	<8.1	<0.5	1.4
Phenol	<150	<0.1	4.3
O-Cresol	<70	<0.2	6.8
P-Cresol	<30	<0.3	6.8
Bis (2-ethylhexyl) phthalate	NA	NA	4.3
Di-n-butyl phthalate	NA	NA	4.3
Total Cyanide, mg/kg	2.2	10	1.8
Total Metals, mg/kg			
Silver	0.54	110	
Arsenic	<2	<50	
Barium	9.6	210	
Cadmium	0.33	7	
Chromium	6.3	160	
Mercury	<0.3	<10	
Nickel	45	780	
Lead	15	340	
Selenium	<2	<50	
TCLP, mg/l (Final raffinate only)			
Total Chromium		0.05	1.7
Arsenic		0.017	0.004
Nickel		0.41	0.048
Selenium		0.103	0.025

<X.X - Analytical confidence limit, RCC did not report values below this limit
NA - Not analyzed for
* - After six washes in laboratory bench scale testing
( ) - Analysis exceeds treatment standard

cont.

TABLE 6.

SHELL K-WASTES EVALUATED BY RESOURCES CONSERVATION COMPANY FOR THEIR AMINE EXTRACTION PROCESS

1. Martinez Refinery API Separator Bottoms (K051)
2. Deer Park Refinery CPI Separator Bottoms (K051)
3. Wood River Refinery Filter Cake (K048/K051)

Cont.

TABLE 5. SHELL OIL COMPANY - PROPANE EXTRACTION TESTS
WOOD RIVER REFINERY FILTER CAKE (K048/K051)

CONSTITUENT	Feed As Received	Final Raffinate* (Dry)	Final Raffinate* (50% water)	Revised BDAT Treat Standard 11/17/89
Total Petroleum Hydrocarbon, %	9	0.06	1.1	
Water Content, %	43	0	50	
Solids, %	48	99.94	48.9	
Volatiles, mg/kg				
Benzene	ND (12)	ND (12)	ND (5.5)	3.9
Toluene	100 (12)	6.5 (12)	130 (5.5)	3.9
Ethylbenzene	370 (12)	9.9 (12)	6 (5.5)	0.08
Xylene	440 (12)	6.9 (12)	70 (5.5)	8.5
Semi-volatiles, mg/kg				
Naphthalene	190 (52)	1.1 (6.7)	0.6 (3.3)	0.84
Anthracene	25 (52)	3.6 (6.7)	1.8 (3.3)	1.4
Phenanthrene	320 (52)	0.3 (6.7)	0.2 (3.3)	0.84
Benzo(A)anthracene	5.9 (52)	ND (6.7)	ND (3.3)	1.4
Pyrene	15 (52)	ND (6.7)	ND (3.3)	1.1
Chrysene	5.9 (52)	ND (6.7)	ND (3.3)	0.84
Benzo(A)pyrene	3.7 (52)	ND (6.7)	ND (3.3)	1.4
Phenol	ND (52)	ND (6.7)	ND (3.3)	4.3
O-Cresol	ND (52)	ND (6.7)	ND (3.3)	6.8
P-Cresol	ND (52)	ND (6.7)	ND (3.3)	6.8
Bis (2-ethylhexyl) phthalate	ND (52)	ND (6.7)	ND (3.3)	4.3
Di-n-butyl phthalate	ND (52)	ND (6.7)	ND (3.3)	4.3
Total Cyanide, mg/kg	NA	17	8.5	1.8
Total Metals, mg/kg				
Silver	<1.2	<1.2		
Arsenic	10	80.4		
Barium	225	614		
Cadmium	<0.92	<0.92		
Chromium	3400	7805		
Mercury	0.9	7.8		
Nickel	133	309		
Lead	37	281		
Selenium	13.9	5.7		
TCLP, mg/l (Final raffinate only)				
Total Chromium			0.096	1.7
Arsenic			0.005	0.004
Nickel			0.211	0.048
Selenium			<0.003	0.025

( ) - Analytical confidence limit, values reported below this level are qualitative.
NA - Not analyzed for
ND - Not detected in sample
* - After five passes through demonstration unit
(value) - Analysis exceeds treatment standard

cont.

TABLE 4. SHELL OIL COMPANY - PROPANE EXTRACTION TESTS
DEER PARK REFINERY CPI SEPARATOR BOTTOMS (K051)

CONSTITUENT	Feed As Received	Final Raffinate* (Dry)	Final Raffinate* (50% water)	Revised BDAT Treat Standard 11/17/89
Total Petroleum Hydrocarbon, %	7	0.3	0.15	
Water Content, %	48	0	50	
Solids, %	45	99.7	99.85	
Volatiles, mg/kg				
Benzene	170 (62)	NA	NA	3.9
Toluene	200 (62)	NA	NA	3.9
Ethylbenzene	120 (62)	NA	NA	0.08
Xylene	610 (62)	NA	NA	8.5
Semi-volatiles, mg/kg				
Naphthalene	13 (50)	3 (2.7)	1.5 (1.3)	0.84
Anthracene	ND (50)	ND (2.7)	ND (1.3)	1.4
Phenanthrene	9 (50)	4.2 (2.7)	2.1 (1.3)	0.84
Benzo(A)anthracene	ND (50)	1.2 (2.7)	0.6 (1.3)	1.4
Pyrene	3 (50)	2.4 (2.7)	1.2 (1.3)	1.1
Chrysene	ND (50)	1.9 (2.7)	1.0 (1.3)	0.84
Benzo(A)pyrene	ND (50)	ND (2.7)	ND (1.3)	1.4
Phenol	ND (50)	ND (2.7)	ND (1.3)	4.3
O-Cresol	ND (50)	ND (2.7)	ND (1.3)	6.8
P-Cresol	ND (50)	ND (2.7)	ND (1.3)	6.8
Bis (2-ethylhexyl) phthalate	NA	NA	NA	4.3
Di-n-butyl phthalate	NA	NA	NA	4.3

( ) - Analytical confidence limit, values reported below this level are qualitative.
NA - Not analyzed for
ND - Not detected in sample
* - After four passes through demonstration unit
(boxed) - Analysis exceeds treatment standard

cont.

TABLE 3. SHELL OIL COMPANY - PROPANE EXTRACTION TESTS
MARTINEZ REFINERY API SEPARATOR BOTTOMS #2 (K051)

CONSTITUENT	Feed As Received	Final Raffinate* (Dry)	Final Raffinate* (50% water)	Revised BDAT Treat Standard 11/17/89
Total Petroleum Hydrocarbon, %	12	1	0.5	
Water Content, %	63	0	50	
Solids, %	25	99	49.5	
Volatiles, mg/kg				
Benzene	5 (5)	ND (16)	ND (8)	3.9
Toluene	190 (5)	29 (16)	14.5 (8)	3.9
Ethylbenzene	60 (5)	260 (16)	130 (8)	0.08
Xylene	419 (5)	660 (16)	330 (8)	8.5
Semi-volatiles, mg/kg				
Naphthalene	87 (500)	1.7 (4.4)	0.9 (2.2)	0.84
Anthracene	20 (500)	1 (4.4)	0.5 (2.2)	1.4
Phenanthrene	77 (500)	4.2 (4.4)	2.1 (2.2)	0.84
Benzo(A)anthracene	18 (500)	0.4 (4.4)	0.2 (2.2)	1.4
Pyrene	33 (500)	0.6 (4.4)	0.3 (2.2)	1.1
Chrysene	23 (500)	0.5 (4.4)	0.3 (2.2)	0.84
Benzo(A)pyrene	ND (500)	ND (4.4)	ND (2.2)	1.4
Phenol	ND (500)	3.1 (4.4)	1.6 (2.2)	4.3
O-Cresol	ND (500)	0.3 (4.4)	0.2 (2.2)	6.8
P-Cresol	ND (500)	0.9 (4.4)	0.5 (2.2)	6.8
Bis (2-ethylhexyl) phthalate	ND (500)	ND (4.4)	NA (2.2)	4.3
Di-n-butyl phthalate	ND (500)	ND (4.4)	NA (2.2)	4.3

( ) - Analytical confidence limit, values reported below this level are qualitative.
NA - Not analyzed for
ND - Not detected in sample
* - After five passes through demonstration unit
(value) - Analysis exceeds treatment standard

cont.

TABLE 2. SHELL OIL COMPANY - PROPANE EXTRACTION TESTS
MARTINEZ REFINERY API SEPARATOR BOTTOMS #1 (K051)

CONSTITUENT	Feed As Received	Final Raffinate* (Dry)	Final Raffinate* (50% water)	Revised BOAT Treat Standard 11/17/89
Total Petroleum Hydrocarbon, %	26	2.3	1.1	
Water Content, %	67	0	50	
Solids, %	7	97.7	48.9	
Volatiles, mg/kg				
Benzene	16 (3)	ND (11)	ND (5.5)	3.9
Toluene	170 (3)	260 (11)	130 (5.5)	3.9
Ethylbenzene	150 (3)	8 (11)	4 (5.5)	0.08
Xylene	910 (3)	140 (11)	70 (5.5)	8.5
Semi-volatiles, mg/kg				
Naphthalene	80 (20)	7.6 (5.7)	3.8 (2.8)	0.84
Anthracene	25 (20)	3.6 (5.7)	1.8 (2.8)	1.4
Phenanthrene	140 (20)	17 (5.7)	8.5 (2.8)	0.84
Benzo(A)anthracene	3.5 (20)	1.4 (5.7)	0.7 (2.8)	1.4
Pyrene	11 (20)	2.9 (5.7)	1.5 (2.8)	1.1
Chrysene	8.2 (20)	2.3 (5.7)	1.2 (2.8)	0.84
Benzo(A)pyrene	1.4 (20)	0.8 (5.7)	0.4 (2.8)	1.4
Phenol	12 (20)	9.6 (5.7)	4.8 (2.8)	4.3
O-Cresol	2.8 (20)	1.9 (5.7)	1.0 (2.8)	6.8
P-Cresol	2.8 (20)	3.8 (5.7)	1.9 (2.8)	6.8
Bis (2-ethylhexyl) phthalate	NA	NA	NA	4.3
Di-n-butyl phthalate	NA	NA	NA	4.3
Total Cyanide, mg/kg	NA	34	17	1.8
Total Metals, mg/kg				
Silver	6.6	94.4		
Arsenic	<.7	<2.8		
Barium	10.7	206		
Cadmium	<.9	<3.9		
Chromium	7	114		
Mercury	<.1	8.4		
Nickel	54.4	677		
Lead	12.6	50.2		
Selenium	0.89	18.5		
TCLP, mg/l (Final raffinate only)				
Total Chromium			0.014	1.7
Arsenic			0.02	0.004
Nickel			1.92	0.048
Selenium			0.026	0.025

( ) - Analytical confidence limit, values reported below this level are qualitative.
NA - Not analyzed for
ND - Not detected in sample
* - After four passes through demonstration unit
( ) - Analysis exceeds treatment standard

cont.

TABLE 1.

SHELL K-WASTES EVALUATED BY THE PROPANE EXTRACTION PROCESS USING THE CF SYSTEMS DEMONSTRATION PILOT UNIT

1. Martinez Refinery API Separator Bottoms #1 (K051)
2. Martinez Refinery API Separator Bottoms #2 (K051)

   In this test xylene was used as a co-solvent during the last two passes and probably contributed significantly to the high level of xylene observed in the final raffinate.
3. Deer Park Refinery CPI Separator Bottoms (K051)
4. Wood River Refinery Filter Cake (K048/K051)
5. Martinez Refinery API Separator Bottoms #3 (K051)

   Analytical results are not yet available.
6. Martinez Refinery Dissolved Air Flotation Float (K048)

   Analytical results are not yet available.

cont.

much lower. Also, as shown in Table 10, the removal efficiency by the same extraction process (CF Systems propane extraction) was considerably greater, indicating that the EPA feeds were more readily treatable than the Shell feeds. Both these factors tend to explain why the revised BDAT Nonwastewater Treatment Standards for organics were not achieved in the Shell testing of the propane extraction process and emphasize the need to increase the database to include a wide variety of feeds.

Wastewater Treatment Standards

The major emphasis of the Shell test program was to evaluate the effectiveness of the solvent extraction processes to treat the solid residues which would be land disposed. The associated waste waters that might be produced would be treated in the refinery effluent treatment plant and discharged under an NPDES permit. However, EPA has proposed standards for the wastewaters (although did not evaluate them in the Vicksburg solvent extraction tests) which set very low concentrations for waste constituents. While solvent extraction should be effective for removing organics, it is not known whether the very low levels set in the BDAT Wastewater Treatment Standards could be routinely achieved. Shell argues that wastewaters produced from the solvent extraction processes should not be subject to the BDAT Wastewater Treatment Standards if they are not land disposed but treated in an effluent treatment plant that operates a NPDES discharge permit.

Future Data

Additional data from the propane extraction tests should be available within the next month when the organic analysis of the remaining samples is reported. Also, fixation and cyanide testing of the residuals should be available at that time. Shell will transmit these results to EPA and would hope that they could still be part of the third/third comments and included in the K048-K052 waste treatment database. In addition, Shell is aware of a test of a commercial sized propane extraction system at a Gulf Coast refinery that is planned by the Petroleum Environmental Research Forum (PERF) in late January. This should provide a very thorough evaluation of the solvent extraction technology and Shell feels that this data should be considered in the establishment of the BDAT Treatment Standards.

cont.

The results for the testing are summarized in Tables 7 - 9. The feed analysis are given on an as received basis and the "washed" solids are on a dry basis. Since the solids from the amine extraction process would be produced water free and pass the paint filter test (the amine solvent removes both the water and the oil) no adjustment for water was made in comparing with the revised BDAT Nonwastewater Treatment Standards. As shown, the standards are exceeded in all the samples tested by one or more of the organic components and in addition by cyanide and metals.

Analytical Confidence Limits Versus Standards

Tables 2 - 5 and Tables 7 - 9 also show the analytical confidence limits (sometimes referred to as detection limits) for the samples. These limits are based on a number of factors including the matrix of the sample being analyzed so will vary from sample to sample. Concentrations reported at levels below these confidence limits provide a qualitative estimate rather than quantitative measurement. As indicated in the tables, the BDAT Nonwastewater Treatment Standards are often below these analytical confidence limits. Shell believes that the performance standards should be measurable when using good analytical procedures and not set at levels that are below the analytical confidence limits.

Analytical Complexity

The analysis of the BDAT Nonwastewater Treatment Standards has proven to be a very expensive and time consumming effort. Costs at an outside laboratory are on the order of $1,000 to $2,000 per sample and the analyses require careful interpretation by highly trained personnel. The laboratory used in these studies cannot guarantee less than a three turnaround and often it takes up to six weeks to get complete results. Shell feels that these extensive analytical requirements are not justified and need to be greatly simplified before these standards can be implemented.

Feed Variability and Extraction Efficiency

Of major concern with the revised BDAT Nonwastewater Treatment Standards is the small data base used to set the standards. As discussed earlier there are a number of factors that can effect feed variability and a broad based data base should be used in establishing standards for a treatment technology. The characteristics of the feeds used in the EPA Vicksburg tests are compared to those found in the Shell feeds tests in Table 10 in terms of aromatic composition and extraction efficiency.

For the four EPA test feeds, the concentration of individual aromatic components typically showed less variation than the four Shell feeds and the upper levels of the feed range were

cont.

Samples of K048 and K051 waste from Shell's refineries at Martinez, California, Deer Park, Texas and Wood River, Illinois were processed in the unit. A total of six refinery K-waste samples were evaluated during these tests as summarized in Table 1.

At the time of this submittal, the analysis of four of the tests has been completed for the BDAT nonwastewater organics and metal constituents in the feed and final raffinate. These are summarized in Tables 2 - 5. The feed analyses are reported on the basis of the sample as collected from the refinery[1]. The analysis of the final raffinate was reported on a dry weight basis by the analytical laboratory and listed in Tables 2 - 6. The analyses were performed by Keystone Environmental Resources, Inc. They participate in the EPA Contract Lab Program for both inorganic and organic analyses and have demonstrated that they can meet the performance criteria set by EPA. The QA/QC data for these analyses is available, if needed by the EPA for verification of these results.

Since the final raffinate from the propane extraction process contains enough water to keep it pumpable, it must be dewatered so it passes the paint filter test before it can be land disposed (e.g., in a MTR landfill). Therefore, the analysis of the final raffinate was adjusted to a 50% water basis to represent a dewatered product that would be ultimately land disposed and is reported in Tables 2 - 5 for comparison with the revised BDAT Nonwastewater Treatment Standards. As indicated in Tables 2 - 5, the final raffinate (adjusted for water) exceeds the revised BDAT standards for many of the organic waste constituents in each of the tests.

Additionally, the values for cyanide and several of the metals of the final raffinate samples exceed the BDAT Treatment Standards by considerable margins.

Amine Extraction Results

Testing of the amine extraction process was conducted by Resources Conservation Company (RCC) in their laboratories using procedures that simulate a commercial application of their process. Three samples of K048-K052 wastes from Shell refineries were tested as summarized in Table 6. A series of six batch extractions with fresh triethylamine was carried out for each waste to simulate the treatment. After the sixth extraction or wash, a sample was analyzed for organics, metals and cyanide by RCC.

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[1] In order to process the material through the unit, additional water had to be added for some wastes to keep them in a pumpable state.

cont.

In order to establish realistic treatment standards for a technology such as solvent extraction, the database should include waste treatment data from a wide variety of waste sources. Therefore, Shell requests that the EPA includes the data submitted here, as well as other data that is being made available by the solvent extraction vendors and other refiners during the Third/Third comment period, in the database and to redetermine the BDAT Nonwastewater Treatment Standards using this expanded database.

While most of the data and comments submitted here are concerned with the BDAT Nonwastewater Treatment Standards for organics, the standards for metals and cyanide are also very stringent. For the tests that Shell has conducted, the solid residue from the solvent extraction process will not pass the metals and cyanide standards and further investigations are in progress to determine if there is appropriate technology available to meet these standards. The levels set for nickel and arsenic are of particular concern and may not be achieveable with current metals fixation technology (which would even eliminate incineration for treatment of these wastes).

The subsequent sections discuss the Shell data from solvent extraction testing and other concerns regarding the BDAT Treatment Standards for the K048-K052 refinery wastes:

Propane Extraction Results

Testing of the propane extraction process was conducted at Shell's Martinez Manufacturing Complex during the period of 9/89 - 11/89 by CF Systems with their two stage pilot demonstration unit. This demonstration unit was also used by EPA in the Vicksburg studies to develop the data that the revised BDAT Nonwastewater Treatment Standards are based and operated under essentially the same conditions.

The testing consisted of charging the feed tank with a sample of waste in a pumpable form and processing it continuously through two stages of countercurrent propane extraction - this is referred to as one "pass". The raffinate, which consisted of water, solids and residual hydrocarbons, was collected and returned to the feed tank at the end of the run for additional passes. From previous testing, CF Systems feels that after about four passes through this demonstration unit most of the benefit of extraction would be realized and the levels achieved would be the basis of a commericial design.

After sampling, the final raffinate from several of the tests was retained for further studies to evaluate metals fixation, cyanide removal and dewatering. These tests are in progress and results are not yet available.

cont.

ATTACHMENT I

Shell Oil Company's Comments On
Section III.A.6.a. Revision of Petroleum Refining Wastes

Shell Oil has recently conducted an experimental evaluation of propane and amine extraction processes for treatment of K048-K051 wastes from several of its refineries as part of a program to address the land disposal restrictions for these wastes. The results available to-date from these tests are included in this attachment and are submitted for addition to the database EPA used to determining BDAT Nonwastewater Treatment Standards for these wastes.

Based on these tests, Shell Oil concludes that the revised BDAT Nonwastewater Treatment Standards for organics in K048-K052 wastes that have been proposed by EPA on November 22, 1989 are unduly stringent and would not be achievable using these solvent extraction processes for typical wastes from its refineries. At this time, the only viable alternative for achieving the revised BDAT Nonwastewater Treatment Standards for organics in K048-K052 wastes may be incineration; while it is assumed that this process will destroy the organics waste constituents to levels below the revised BDAT Nonwastewater Treatment Standards, there is limited data to confirm this.

Shell feels that solvent extraction would be preferable to incineration since it is a recovery process and would substantially minimize the amount of waste being disposed in accord with Shell's and EPA's waste management philosophy. Incineration is a destructive treatment process and would not be considered waste minimization.

While the revised BDAT Nonwastewater Treatment Standards for organics were based on solvent extraction test data available to the EPA, the waste for these tests was obtained only from a single refinery source and Shell does not feel that this represents the variability of refining wastes across the country. The concentration of BDAT organic waste constituents in this waste are substantially lower than the K048-K052 wastes obtained from Shell refineries. Also the apparent extraction efficiencies for the EPA waste are substantially higher than for the Shell wastes. The reasons for this variability are not fully understood and would be difficult to control but are related to:

1. The crude types being processed
2. The refinery configuration
3. Daily changes in refinery operation
4. Chemical and physical nature of the solids in the wastes (e.g., porosity, particle size, surface activity, etc.)

cont.

Comment Number: 48-C-12

Docket Number: LD12-00185

Commenter: Shell Oil

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Standards for First-Third Refinery K048-K052 Wastes

We are pleased the Agency has allowed for further submission of data from treatment of the petroleum refinery listed K wastes. Attachment I includes the latest Shell data and some of that data has already been submitted to the Agency. From Shell's evaluation and our participation in the API effort to develop a data set, we offer the following comment.

- The data show high variability in results from identical technology processes used on different feed stocks.

  Undertaking the plant scale design of solvent extraction equipment to meet the promulgated earlier standards would be extremely risky at this time with only a low probability of being assured that the equipment could consistently meet the promulgated regulatory limits. We urge the Agency to evaluate the entire petroleum industry data set and modify the regulatory standards very soon such that equipment design can begin with a reasonable expectation of being able to comply with the eventual standards.

- Incineration technology is the least preferred alternative to attempt to meet the LDR limits and will not recover reusable waste constituents. In this case, we are concerned about the assurances that the technology is generally available to meet the promulgated regulatory limits on incineration residues. We urge the Agency to review the data available and confirm the viability of using this severe technology option to achieve the most desirable results.

- While time is growing short, the August 8, 1990 effective date for the LDRs on the K048-K052 wastes should not close off continuing data submission at this time. The submission deadline should be extended say for 6 months to assure that the technology based limits in fact represent the technology capabilities at this time.

Cont.

Comment Number: 48-C-11

Docket Number: LD12-L0020

Commenter: Amoco

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The Agency received several sets of data from stabilization of K048-K052 treatment residuals during the public comment period for the proposed Third Third rule, some of which represented full-scale treatment.

The Agency is promulgating revised BDAT treatment standards for metal constituents in K048-K052 nonwastewaters. The revised standards were developed using several data sets for stabilization treatment of metal constituents in K048-K052 nonwastewater residuals, including two data sets submitted by industry and one set of data generated by the Agency. These data sets met the Agency's data quality screening criteria and were used in developing the revised standards.

None of the data submitted by industry show treatment of arsenic and selenium. Additionally, the Agency acknowledges that only marginal evidence of treatment of arsenic and selenium is shown in the stabilization data generated by EPA. Therefore, the Agency is deleting the treatment standards for arsenic and selenium in nonwastewater forms of K048-K052.

Data submitted by industry contained significantly higher concentrations of nickel than the wastes tested by the Agency. In order to account for the maximum variability of nickel concentrations in K048-K052 wastes, the Agency is revising the treatment standard for nickel using the data submitted by industry.

The treated waste data from the Agency-conducted stabilization test that were used to develop the treatment standard promulgated for chromium in K048-K052 nonwastewaters in the First Third rule were first adjusted for analytical recovery. Next, the Agency performed a statistical comparison of the untreated and treated wastes and was able to establish that statistically significant treatment had occurred for chromium. (Prior to the statistical comparison, the Agency discounted the effects of dilution by the binders and the presence of metals in the binder materials.) Finally, a variability factor was used in the treatment standard calculation to account for variability in the treatment system and in the collection and analysis of treated waste samples. The stabilization data submitted by industry indicate that the treatment standard for chromium is achievable for the complete range of K048-K052 wastes tested using stabilization treatment. Therefore, the treatment standard for chromium remains as promulgated in the First Third rule.

Comment Number: 48-C-11

Docket Number: LD12-L0020

Commenter: Amoco

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

As the Agency considers setting revised standards for metals, Amoco strongly encourages the Agency to remember that these data, and the data collected by the Agency, all result from bench-scale tests. The ability of fixation technology to meet these levels on a full scale operation has not been demonstrated. These tests also do not reflect the variability of wastes among the industry, or even the variation which can be expected over time at this one refinery. This issue may be particularly important for wastes which were generated some time ago, but which will become subject to the land disposal restriction as a result of cleanup operations. Wastes generated today can be expected to contain significantly less chromium, for example, as a result of its decreased use as a water treatment chemical in refineries. Therefore, treatment for chromium may be much more difficult for previously generated wastes. To reiterate our previous comments, we encourage the Agency to set standards which can be reached through diligent efforts by industry to comply.

Comment Number: 48-C-10

Docket Number: LD12-L0039

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The variability factor used by the Agency in calculating treatment standards accounts for the variability inherent in the performance of treatment systems as well as in the collection and analysis of treated samples. The Agency believes that due to variations in feedstocks, refining processes, and wastewater treatment systems at refineries, there is a large variability between K048-K052 wastes generated from different refineries in the U.S., as evidenced by the range of constituent concentration data for untreated K048-K052 wastes available to the Agency. In order to set realistic and achievable BDAT treatment standards, the Agency must account for the most difficult to treat wastes (typically those containing the highest constituent concentrations in the untreated wastes). Furthermore, the treatment data indicate that solvent extraction technologies are, to some extent, waste matrix dependent so that variations in waste feed must be taken into account in assessing their performance. The Agency has accounted for both the most difficult to treat wastes and between-refinery waste variability in calculating the revised promulgated BDAT treatment standards by using several data sets representing treatment of K048-K052 wastes from various refineries.

The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for K048-K052 nonwastewater organic constituents is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards.

Comment Number: 48-C-10

Docket Number: LD12-L0039

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

One thing that is certain from this data analysis — the proposed revisions to the standards for K048—K052 nonwastewaters presented in the BDAT Report Amendment are completely unreasonable. They do not represent between-refinery variability in waste treatment performance; moreover, they do not even represent within refinery variability because they consist of four separate extractions of the same batch of refinery waste. This means that the *only* variability that is measured by EPA's data is the reproducibility of the process performance and analytical uncertainty. This is not *process variability*, since the process is not subject to normal feedstock characteristic variations.

EPA's propane extraction data, while it adds valuable information to the data base, is not usable by itself to establish BDAT limits for all K048—K052 petroleum refinery nonwastewaters because it is only a single waste sample from a single refinery — it includes neither within-plant nor between-plant waste characteristic variability, and provides limited process variability data for extraction;

Comment Number: 48-C-9

Docket Number: LD12-L0026

Commenter: CF Systems

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT nonwastewater organic treatment standards. However, the Agency acknowledges that some of these units may require process adjustments.

Comment Number: 48-C-9

Docket Number: LD12-L0026

Commenter: CF Systems

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Data from one solvent extraction method using multiple sources should be used to establish the BDAT standard to be met by all solvent extraction methods.

Comment Number: 48-C-8

Docket Number: LD12-L0026/LD12-L0037

Commenter: CF Systems

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

(Continued)

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards.

Comment Number: 48-C-8

Docket Number: LD12-L0026/LD12-L0037

Commenter: CF Systems

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

A single BDAT treatment standard has been developed for each regulated constituent in K048-K052 nonwastewaters and wastewaters. This standard is applicable regardless of the level at which a particular regulated constituent is present in the waste feed.

The variability factor used by the Agency in calculating treatment standards accounts for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples. The Agency believes that due to variations in feedstocks, refining processes, and wastewater treatment systems at refineries, there is a large variability between K048-K052 wastes generated from different refineries in the U.S., as evidenced by the range of constituent concentration data for untreated K048-K052 wastes available to the Agency. In order to set realistic and achievable BDAT treatment standards, the Agency must account for the most difficult to treat wastes (typically those containing the highest constituent concentrations in the untreated wastes). Furthermore, the treatment data indicate that solvent extraction technologies are, to some extent, waste matrix dependent so that variations in waste feed must be taken into account in assessing their performance. The Agency has accounted for both the most difficult to treat wastes and between-refinery waste variability in calculating the revised promulgated BDAT treatment standards by using several data sets representing treatment of K048-K052 wastes from various refineries.

The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for K048-K052 nonwastewater organic constituents is described below.

Comment Number: 48-C-8

Docket Number: LD12-L0026/LD12-L0037

Commenter: CF Systems

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Feed variability indeed is accounted for in developing a statistical "average" that results in a single constituent BDAT number.

However, BDAT numbers should not be developed for a "compound x" based on the level at which it is found in a given feed. For example, there should not be one BDAT limit for 1-10 ppm levels in a given feed, another for those feeds having 11-100 ppm etc. Feed variability in this context should not be accounted for.

CF Systems favors developing BDAT standards using the largest population of feed samples possible given the above constraints regarding QA/QC and "commercially available". It seems to us that that simply represents good scientific method. However, we want to emphasize that we do not favor establishing a multiplier for each BDAT constituent standard such that a different de facto BDAT standard is developed and used for each constituent based on the concentration of that constituent in any given feed being treated.

Comment Number: 48-C-7

Docket Number: LD12-00085

Commenter: Resources Conservation Company

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The only constituents regulated in the Third Third rule for K048-K052 that were not regulated in the promulgated First Third rule are cyanides in wastewaters and xylenes and naphthalene in nonwastewaters (which were reserved in the First Third rule). The intent to regulate these constituents was discussed in the First Third preamble, but the appropriate treatment data were not available to the Agency in time to be included in that rule.

The Agency has considered the variability in K048-K052 wastes in developing the promulgated treatment standards. The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT nonwastewater organic treatment standards. However, the Agency acknowledges that some of these units may require process adjustments.

In addition, the Agency also accounted for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples by using a variability factor to develop revised BDAT treatment standards at a 99% confidence level for organic constituents in nonwastewater forms of K048-K052.

Comment Number: 48-C-7

Docket Number: LD12-00085

Commenter: Resources Conservation Co.

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Resources Conservation Company (RCC) understands that EPA now plans to revise the already established BDAT standards for many regulated constituents in K048-K052 nonwastewaters. In addition, EPA is expected to establish standards for treatment of certain constituents for which standards were not established as a part of the original rulemaking. While RCC agrees that revision of the BDAT standards may be appropriate, in our view such revisions should be based upon a broader sample of actual waste compositions within each of the respective waste treatability codes than EPA has heretofore examined.

Comment Number: 48-C-6

Docket Number: LD12-00031

Commenter: Exxon

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The Agency acknowledges Exxon's support for the use of solvent extraction technologies in developing BDAT treatment standards for K048-K052 wastes.

The Agency has considered the variability in K048-K052 wastes in developing the promulgated treatment standards. The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT nonwastewater organic treatment standards. However, the Agency acknowledges that some of these units may require process adjustments.

In addition, the Agency also accounted for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples by using a variability factor to develop revised BDAT treatment standards at a 99% confidence level for organic constituents in nonwastewater forms of K048-K052.

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Comment Number: 48-C-6

Docket Number: LD12-00031

Commenter: Exxon

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

In summary, Exxon supports the Agency's position that solvent extraction is an environmentally sound and attractive alternative to incineration for treating the listed refinery wastes. Exxon believes, that in setting the BDAT standards for listed refinery wastes, the Agency must consider the performance of treatment technologies on a wider universe of listed refinery wastes rather than a particular single waste to ensure that the standards can be broadly achieved. Finally, Exxon recognizes that the Multicycle process has shown the potential to meet the previously promulgated BDAT standards and many of the proposed revised BDAT standards. However, Exxon is concerned that there is not sufficient operating margin between the performance of the Multicycle process and the requirements of a never-to-be exceeded standard. To ensure that the Multicycle process can reliably and routinely meet the BDAT standards on all Exxon wastes, it will be necessary to conduct further evaluations of the process. In conclusion, Exxon believes that for solvent extraction to be a viable technology for treating the listed refinery wastes, the BDAT standards must reflect a broader range of wastes and provide an adequate operating margin for day-to-day variations in feed and process performance.

TABLE 3 BENCH SCALE AMINE EXTRACTED SOLIDS INSPECTIONS

- Constituents shown in boxes failed composite BDAT Standards
- Oily impoundment not covered by BDAT Standard
- Treated Solids not stabilized

		API-1 SLUDGE	OILY IMPOUND-MENT SLUDGE	SLOP OIL SOLIDS	MIXED TANK BOTTOMS	DAF FLOAT	COMPOSITE BDAT STANDARD
GENERAL	Oil & Grease, % (1)	NA	0.04	0.025	0.019	NA	
	Solids, %	NA	99.4	99.5	99.6	NA	
	Water, %	NA	0.6	0.5	0.4	NA	
	Total Cyanide, ppm	NA	1	0.5	1	NA	1.8
VOLATILES, ppm*	Benzene	ND (0.095)	ND (0.012)	ND (0.025)	ND (0.005)	ND (1.2)	9.5
	Ethyl Benzene	ND (0.095)	ND (0.012)	ND (0.025)	ND (0.005)	ND (1.2)	67
	Toluene	0.1	0.13	0.044	0.0053	ND (1.2)	9.5
	Total Xylenes	ND (0.095)	0.02	0.044	ND (0.005)	ND (1.2)	(R)
SEMI VOLATILES, ppm*	Naphthalene	8.7	2.1	9	0.61	ND (1.5)	(R)
	1-Methylnaphthalene	9.7	0.96	8.4	0.99	ND (1.5)	--
	Anthracene	6.7	ND (0.66)	3.6	ND (0.33)	ND (1.5)	6.2
	Phenanthrene	24	1.5	11	2.6	ND (1.5)	7.7
	Benzo(a)anthracene	3	0.78	2.5	ND (0.33)	0.2	1.4
	Chrysene	2.3	1.5	1.6	0.97	ND (1.5)	2.2
	Pyrene	5.3	1	3.3	0.78	ND (1.5)	2.0
	Benzo(a)pyrene	1.7	ND (0.66)	2	ND (0.33)	0.24	0.84
	bis(2-Ethylhexyl) phthalate	1000**	0.99	310**	0.98	320**	37
	Di-n-butyl phthalate	ND (4.6)	ND (0.66)	ND (2.6)	ND (0.33)	ND (1.5)	4.2
	o-Cresol	ND (4.6)	ND (0.66)	ND (2.6)	ND (0.33)	ND (1.5)	2.2
	m & p-Cresol (s)	ND (4.6)	ND (0.66)	ND (2.6)	ND (0.33)	0.22	0.9
	Phenol	ND (4.6)	ND (0.66)	ND (2.6)	ND (0.33)	ND (1.5)	2.7
TCLP LEACHATE, mg/l (w/o stabilization)	Arsenic	0.008	0.016	0.008	ND (0.004)	NA	0.004
	Chromium	0.11	ND (0.01)	0.26	ND (0.05)		1.7
	Nickel	1.4	0.37	3	0.6		0.048
	Selenium	0.02	ND (0.02)	ND (0.02)	ND (0.02)		0.025

(1) By Freon Extraction
* Total Constituent Concentration

cont.

48-C-6

TABLE 2 PROPANE EXTRACTED SOLIDS INSPECTIONS

- Constituents shown in boxes failed BDAT Standard
- Oily impoundment not covered by BDAT Standard
- Treated solids filtered but not stabilized

		API-1 SLUDGE	OILY IMPOUND-MENT SLUDGE	SLOP OIL SLUDGE	MIXED TANK BOTTOMS	DAF FLOAT	COMPOSITE BDAT STANDARD
GENERAL (Filtered Raffinate)	Oil & Grease, % (1)	0.068	0.1	0.198	0.049	0.04	
	Solids, %	24.9	33.4	44.4	32.6	27.1	
	Water, %	75.0	66.5	55.4	67.4	72.9	
	Total Cyanide, ppm	ND (0.5)	0.8	0.5	0.5	ND (0.5)	1.8
VOLATILES, ppm*	Benzene	ND (1)	ND (0.5)	ND (5)	ND (0.5)	ND (0.65)	9.5
	Ethyl Benzene	ND (1)	ND (0.5)	ND (5)	ND (0.5)	ND (0.65)	67
	Toluene	2	ND (0.5)	ND (5)	ND (0.5)	ND (0.65)	9.5
	Total Xylenes	4.1	0.77	7.9	ND (0.5)	1.2	(R)
SEMI VOLATILES, ppm*	Naphthalene	15	3.4	1.8	14	3	(R)
	1-Methylnaphthalene	15	3.1	1.5	14	3	--
	Anthracene	7.8	1.8	ND (1.3)	7.6	1.5	6.2
	Phenanthrene	25	5.3	1.8	24	4.7	7.7
	Benzo(a)anthracene	7.2	2	ND (1.3)	6.8	1.6	1.4
	Chrysene	5.2	2.2	ND (1.3)	4.8	2.3	2.2
	Pyrene	14	2.9	1.8	13	3.3	2.0
	Benzo(a)pyrene	4.3	1.9	0.93	3.9	1.7	0.84
	bis(2-Ethylhexyl) phthalate	2.6	ND (1.1)	ND (1.3)	2.5	ND (0.99)	37
	Di-n-butyl phthalate	ND (1.3)	ND (1.1)	ND (1.3)	ND (2.2)	ND (0.99)	4.2
	o-Cresol	ND (1.3)	ND (1.1)	ND (1.3)	ND (2.2)	ND (0.99)	2.2
	m & p-Cresol (s)	0.25	0.52	ND (1.3)	ND (2.2)	0.1	0.9
	Phenol	ND (1.3)	ND (1.1)	ND (1.3)	ND (2.2)	ND (0.99)	2.7
TCLP LEACHATE, mg/l (w/o stabilization)	Arsenic	0.013	0.02	0.017	0.014	0.023	0.004
	Chromium	0.44	0.62	0.91	0.56	0.57	1.7
	Nickel	1.8	1.3	1.3	1.1	1	0.048
	Selenium	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.025

(1) By Freon Extraction
* Total Constituent Analysis

cont.

TABLE 1 SOLVENT EXTRACTION FEED STOCK INSPECTIONS

		API-1 SLUDGE	API-2 SLUDGE	OILY IMPOUND-MENT SLUDGE	SLOP OIL SOLIDS	MIXED TANK BOTTOMS	DAF FLOAT
GENERAL							
	Oil & Grease, %	8.5	7.1	4.4	13	9.9	7.2
	Solids, %	13.3	26.2	19.5	33	53	8
	Water, %	78.2	66.7	76.1	54	37.1	84.8
	Total Cyanide, ppm	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
VOLATILES, ppm*							
1 Ring	Benzene	120	5.6	8.7	100	3.6	ND (1.0)
	Ethyl Benzene	150	14	30	160	8.6	ND (1.0)
	Toluene	750	37	24	1300	5.7	ND (1.0)
	Total Xylenes	880	75	100	1600	31	4.1
SEMI VOLATILES, ppm*							
2 Ring	Naphthalene	550	85	110	340	33	ND (40)
	1-Methylnaphthalene	690	180	160	380	79	ND (40)
3 Ring	Anthracene	140	21	8.9	47	19	ND (40)
	Phenanthrene	540	120	76	190	95	20
4 Ring	Benzo(a)anthracene	70	14	19	29	10	9.7
	Chrysene	58	26	31	22	49	17
	Pyrene	160	39	31	61	43	ND (40)
5 Ring	Benzo(a)pyrene	42	9.1	14	20	6.1	13
	bis(2-Ethylhexyl) phthalate	ND (200)	12	ND (40)	ND (190)	ND (33)	ND (40)
	Di-n-butyl phthalate	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
	o-Cresol	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
	m & p-Cresol (s)	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
	Phenol	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
METALS, ppm*							
	Arsenic	1.7	0.7	4	3.1	6.2	1.6
	Chromium	190	3	20	330	82	9
	Nickel	95	5	27	250	180	8
	Selenium	0.4	0.5	3.2	2	2	3

Cont.

* Total Constituent Analysis

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Comment Number: 48-C-6

Docket Number: LD12-00031

Commenter: Exxon

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Exxon also takes exception to basing the proposed revised standards for the listed refinery wastes only on the recent CF Systems (Vicksburg) tests. regardless of whether the Agency believes the "data show better or similar treatment than the data used to develop the previously promulgated standards". and "that the new data provide the most substantial treatment for the greatest number of organic constituents of concern than all of the other solvent extraction data available to the Agency" (54 FR 48460). Generally, Exxon believes that the BDAT standards must reflect a much wider universe of wastes than a single point to ensure that the standards are broadly achievable. It is clear from Table 1 that the waste used as the basis for revising the BDAT standards was low in many of the hazardous organic constituents, and it is thus not surprising that the concentrations of hazardous organic constituents were lower in the resulting treated solids. (Similarly, Exxon believes that the waste used in previously promulgated BDAT standards also does not adequately reflect the treatability of the universe of wastes.) Exxon has tested the CF Systems technology used in developing these proposed revisions, the Multicycle technology used in setting the previously promulgated standards and the RCC B.E.S.T. technology. The performance data for organic constituents are summarized in Table 2 for API sludge (K051) and Table 3 for Slop Oil Emulsion Solids (K049). The CF Systems, RCC B.E.S.T., and the Multicycle-Test 1 data are the same as were presented during our September 26, 1989 and November 9, 1989 meetings with the Agency. The Multicycle-Test 1 results are for unoptimized process conditions.

Cont.

Comment Number: 48-C-5

Docket Number: LD12-00224

Commenter: Texaco

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The Agency has considered the variability in K048-K052 wastes in developing the promulgated treatment standards. The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT nonwastewater organic treatment standards. However, the Agency acknowledges that some of these units may require process adjustments.

In addition, the Agency also accounted for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples by using a variability factor to develop revised BDAT treatment standards at a 99% confidence level for organic constituents in nonwastewater forms of K048-K052.

Comment Number: 48-C-5

Docket Number: LD12-00224

Commenter: Texaco

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Texaco supports EPA's decision to include solvent extraction technology as BDAT for the K048-K052 wastes (53 FR 31159). However, the standards initially established under the "First Third" Final Rule were based on the treatment of only one waste stream which contained very low or non-detectable levels of many of the constituents for which the standards were established. Consequently, a large majority of the refining industry's waste streams cannot meet those standards utilizing solvent extraction technology due to the variability between their waste streams and those upon which the standards were based.

Comment Number: 48-C-4

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

(Continued)

The Agency disagrees with the commenter that it cannot, to some extent, take into account the recovery/waste minimization benefits associated with solvent extraction technologies. The legislative history to the land ban indicates that recovery technologies are the preferred means of managing hazardous waste. As long as the recovery technology satisfies the RCRA Section 3004(m) requirement to substantially reduce waste toxicity or mobility so as to minimize threats to human health and the environment, the Agency may reasonably consider it even if a destruction technology may perform somewhat better. (EPA also is somewhat surprised by this comment, given the commenter's vociferous support of solvent extraction technology in the First Third rule, when it already appeared that incineration technology performed better because it reduced most organic constituents to non-detectable levels whereas solvent extraction did not.)

Comment Number: 48-C-4

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The variability factor used by the Agency in calculating treatment standards accounts for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples. The Agency believes that due to variations in feedstocks, refining processes, and wastewater treatment systems at refineries, there is a large variability between K048-K052 wastes generated from different refineries in the U.S., as evidenced by the range of constituent concentration data for untreated K048-K052 wastes available to the Agency. In order to set realistic and achievable BDAT treatment standards, the Agency must account for the most difficult to treat wastes (typically those containing the highest constituent concentrations in the untreated wastes). Furthermore, the treatment data indicate that solvent extraction technologies are, to some extent, waste matrix dependent so that variations in waste feed must be taken into account in assessing their performance. The Agency has accounted for both the most difficult to treat wastes and between-refinery waste variability in calculating the revised promulgated BDAT treatment standards by using several data sets representing treatment of K048-K052 wastes from various refineries.

The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for K048-K052 nonwastewater organic constituents is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards.

Comment Number: 48-C-4

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

3. Qualitative Factors, Waste Feed Variability

In addition, we strongly oppose as a general principle the Agency taking qualitative factors into account (e.g., favoring recycling simply because it is "recycling") when setting quantitative standards, such as is suggested in the preamble. This matter is discussed more fully in Section XII of the comments. While we believe solvent extraction meets the quantitative criteria for BDAT, any technology, whether such technology is termed "recycling" or "treatment", it should be objectively evaluated on the basis of performance with regard to the characteristics of all remaining residuals that must be disposed. The Council also opposes taking into account feed variability factors such as different constituent concentrations in the waste. It is the operational parameters of the technology and their ability to conform a wide variety of wastes to a given standard that are part of the best available technology determination. Once feed variability factors begin to be taken into account there is virtually an infinite variety of potential combinations and permutations forced upon the Agency in the establishment of any BDAT. Feed variability factors are already accounted for in the manner of statistics applied to the current variability factor used in EPA's current generic BDAT protocols. Applying a variability factor to the waste feed is "double dipping", or adding variability factor on variability factor until you get the standard you want. This type of biased statistical maneuver is really an attempt at masking the fact that the technology is not really "best".

Comment Number: 48-C-4

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

The Council also opposes taking into account feed variability factors such as different constituent concentrations in the waste. It is the operational parameters of the technology and their ability to conform a wide variety of wastes to a given standard that are part of the best available technology determination. Once feed variability factors begin to be taken into account there is virtually an infinite variety of potential combinations and permutations forced upon the Agency in the establishment of any BDAT. Feed variability factors are already accounted for in the manner of statistics applied to the current variability factor used in EPA's current generic BDAT protocols. Applying a variability factor to the waste feed is "double dipping", or adding variability factor on variability factor until you get the standard you want. This type of biased statistical maneuver is really an attempt at masking the fact that the technology is not really "best".

Cont.

Comment Number: 48-C-3

Docket Number: LD12-00168

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The Agency has considered the variability in K048-K052 wastes in developing the promulgated treatment standards. The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT nonwastewater organic treatment standards. However, the Agency acknowledges that some of these units may require process adjustments.

In addition, the Agency also accounted for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples by using a variability factor to develop revised BDAT treatment standards at a 99% confidence level for organic constituents in nonwastewater forms of K048-K052.

Comment Number: 48-C-3

Docket Number: LD12-00168

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

API's petition and its accompanying support document discuss specific problems associated with the calculation of certain metals standards and discusses problems with the standards due to insufficient consideration of variability of the concentrations of all constituents in the waste feed stock. API again alerts EPA to the fact that the composition of crude oil and the configuration of refineries are not nationally consistent and a data base which encompasses a variety of crude sources is necessary to develop adequate standards.

Comment Number: 48-C-2

Docket Number: LD12-00085

Commenter: Resources Conservation Company

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The Agency has considered the variability in K048-K052 wastes in developing the promulgated treatment standards. The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT nonwastewater organic treatment standards. However, the Agency acknowledges that some of these units may require process adjustments.

In addition, the Agency also accounted for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples by using a variability factor to develop revised BDAT treatment standards at a 99% confidence level for organic constituents in nonwastewater forms of K048-K052.

Comment Number: 48-C-2

Docket Number: LD12-00085

Commenter: Resources Conservation Co.

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Resources Conservation Company (RCC) understands that EPA plans to propose revised BDAT standards for many regulated constituents in K048-K052 non-wastewaters. While RCC agrees that revision of the BDAT standards may be appropriate, in our view such revisions should be based upon a broader sample of actual waste compositions within each of the respective waste treatability codes than EPA has heretofore examined. Additionally, review of data recently made available shows the data is normally distributed regarding the treatability of wastes in the relevant waste categories. Such data can be utilized in a conventional Gaussian distribution statistical method to establish realistic treatment standards at a 99% confidence level.

Comment Number: 48-C-1

Docket Number: LD12-00031

Commenter: Exxon

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Response:

The ranges of waste concentrations reported by Exxon are similar to those in the wastes tested by the Agency. Some constituent concentrations reported by Exxon for several of their wastes tested are higher than for the same constituents in the Agency tested wastes, while others were lower. Therefore, EPA believes that the waste characterization data submitted by Exxon supports the Agency's assumption that the wastes tested by EPA are representative of typical K048-K052 wastes. In addition, it is likely that mixtures of wastes may be more difficult to treat than individual wastes due to interferences among the waste matrices. Therefore, testing a mixture of wastes would not result in artificially low standards for the more difficult to treat waste because of dilution effects.

The Agency has further considered the variability in K048-K052 wastes in developing the promulgated treatment standards. The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 wastes were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT nonwastewater organic treatment standards. However, the Agency acknowledges that some of these units may require process adjustments.

In addition, the Agency also accounted for the variability inherent in the performance of treatment systems and in the collection and analysis of treated samples by using a variability factor to develop revised BDAT treatment standards at a 99% confidence level for organic constituents in nonwastewater forms of K048-K052.

TABLE 1 SOLVENT EXTRACTION FEED STOCK INSPECTIONS

		API-1 SLUDGE	API-2 SLUDGE	OILY IMPOUND-MENT SLUDGE	SLOP OIL SOLIDS	MIXED TANK BOTTOMS	DAF FLOAT
GENERAL							
	Oil & Grease, %	8.5	7.1	4.4	13	9.9	7.2
	Solids, %	13.3	26.2	19.5	33	53	8
	Water, %	78.2	66.7	76.1	54	37.1	84.8
	Total Cyanide, ppm	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
VOLATILES, ppm*							
1 Ring	Benzene	120	5.6	8.7	100	3.6	ND (1.0)
	Ethyl Benzene	150	14	30	160	8.6	ND (1.0)
	Toluene	750	37	24	1300	5.7	ND (1.0)
	Total Xylenes	880	75	100	1600	31	4.1
SEMI VOLATILES, ppm*							
2 Ring	Naphthalene	550	85	110	340	33	ND (40)
	1-Methylnaphthalene	690	180	160	380	79	ND (40)
3 Ring	Anthracene	140	21	8.9	47	19	ND (40)
	Phenanthrene	540	120	76	190	95	20
4 Ring	Benzo(a)anthracene	70	14	19	29	10	9.7
	Chrysene	58	26	31	22	49	17
	Pyrene	160	39	31	61	43	ND (40)
5 Ring	Benzo(a)pyrene	42	9.1	14	20	6.1	13
	bis(2-Ethylhexyl) phthalate	ND (200)	12	ND (40)	ND (190)	ND (33)	ND (40)
	Di-n-butyl phthalate	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
	o-Cresol	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
	m & p-Cresol (s)	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
	Phenol	ND (200)	ND (36)	ND (40)	ND (190)	ND (33)	ND (40)
METALS, ppm*							
	Arsenic	1.7	0.7	4	3.1	6.2	1.6
	Chromium	190	3	20	330	82	9
	Nickel	95	5	27	250	180	8
	Selenium	0.4	0.5	3.2	2	2	3

* Total Constituent Analysis

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Comment Number: 48-C-1

Docket Number: LD12-00031

Commenter: Exxon

Issue: K048-K052

Subissue: Variability of Wastes Used to Establish BDAT Treatment Standards

Comment:

Exxon's in-depth assessment (as detailed below) demonstrates that the proposed BDAT standard failed to adequately account for the normal variability in waste streams and improperly assumed a single treatment facility was representative of typical facilities. In short, the demonstration utilized in defining the proposed standard was, in our view, deficient. Exxon takes exception to the Agency's assertion "that the use of a small number of data sets from a single treatment facility can be representative of the treatment achieved by the particular treatment system," and that the Agency has selected "wastes that are representative of those most difficult to treat" (54 FR 48385). Relative to the first of these assertions, Exxon has tested several of its wastes on both of the solvent extraction technologies that the Agency has considered in establishing the BDAT standards. A comparison of the results from these tests with the data used in setting both the original standards and the proposed standards clearly shows that a small data set does not adequately represent the performance of a given technology on a broad spectrum of wastes. In most of the Exxon tests, neither of the solvent extraction technologies were able to achieve either the originally promulgated standards or the proposed revisions. (Details of these tests are discussed in more detail in the comments to follow.) Regarding the second of the Agency's assertions, Table 1 of these comments provides a comparison of the wastes used in setting the standards. It is clear in this comparison that the wastes used in establishing the BDAT standards were lower in hazardous organic constituents than many of the Exxon listed refinery wastes. Additionally, Exxon takes exception to setting the BDAT standards on a mixture of two listed wastes since one or the other will be more difficult to treat, and thus, the more difficult waste will be diluted by the less difficult waste resulting in an artificially low standard for the more difficult waste.

Cont.

Comment Number: 48-Biib-1

Docket Number: LD12-00224

Commenter: Texaco

Issue: K048-K052

Subissue: Standards Based on Scrubber Water

Response:

EPA is not aware of any K048-K052 wastes that meet the definition of wastewater as generated. However, wastewater forms of K048-K052 may be generated during the treatment of these wastes (e.g., scrubber water generated by incineration). The solvent extraction technologies that the Agency is aware of do not generate a wastewater stream (a treatment residual must contain <1% total organic carbon and <1% total suspended solids to be considered a wastewater under the Land Disposal Restrictions program). Therefore, EPA has based the treatment standards for organic constituents in wastewater forms of K048-K052 on the only wastewater data available specifically for K048-K052, the scrubber water generated by incineration of these wastes. EPA reminds the commenter that other technologies that can meet the BDAT treatment standards are not precluded from use.

Comment Number: 48-Biib-1

Docket Number: LD12-00224

Commenter: Texaco

Issue: K048-K052

Subissue: Standards Based on Scrubber Water

Comment:

In general, we strongly oppose the establishment of wastewater standards based on incinerator scrubber water. This presupposes the use of incineration as the treatment technology and excludes the use of other technologies which have resource conservation advantages and represent a lesser threat to human health and the environment.

Comment Number: 48-Biia-1

Docket Number: LD12-00224

Commenter: Texaco

Issue: K048-K052

Subissue: Cyanide Standard

Response:

The Agency currently has only incineration treatment data specifically for cyanide in K048-K052 wastes. These data clearly show substantial treatment of cyanide in nonwastewater and wastewater forms of K048-K052. No data are currently available for the treatment of cyanide in K048-K052 wastes by other technologies. The Agency did not consider transferring treatment performance data for cyanide from the reactive cyanide wastes or from multi-source leachate because the Agency believes it is more appropriate to use treatment performance data from the specific regulated waste, when it is available, to develop BDAT treatment standards. Therefore, consistent with EPA's promulgated methodology, incineration has been identified as BDAT for cyanide in K048-K052 and treatment performance data from incineration of K048-K052 were used to develop the BDAT treatment standard for cyanide.

Comment Number: 48-Biia-1

Docket Number: LD12-00224

Commenter: Texaco

Issue: K048-K052

Subissue: Cyanide Standards

Comment:

Cyanide Issue - In order for solvent extraction to be a viable BDAT process, EPA needs to reevaluate the current and proposed standards for cyanide in K048-K052 non-wastewaters and wastewaters, respectively, which have been based on incineration. These cyanide standards will force many refiners to utilize incineration, although solvent extraction followed by alkaline chlorination or other cyanide reduction technology would achieve levels of cyanide in the residues or wastewaters which would substantially reduce the toxicity of the waste streams.

We recommend that in the absence of treatment data for solvent extraction residue that standards be reserved for cyanide until these data can be developed. For the cyanide wastewater

standards, we recommend that the proposed standards established for reactive cyanides and multi-source leachate be applied to this waste stream. This would establish the cyanide wastewater limit at 1.9 mg/L for K048-052 wastes.

The cyanide nonwastewater standards for K048-K052 should be reserved until research on the cyanide reduction technologies on solvent extraction residue can be completed. The cyanide wastewater standards should be based on wastewater treatment

technologies and therefore changed to 1.9 mg/L to be consistent with the proposed standards established for reactive cyanides.

Comment Number: 48-Bie-1

Docket Number: LD12-L0039

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Nonwastewater BDAT Treatment Standards

Response:

The Agency evaluated all available K048-K052 treatment data (industry-submitted and EPA-generated) for consideration in revising K048-K052 nonwastewater BDAT treatment standards. Only those data which met the Agency's data quality screening criteria were used to promulgate revised BDAT treatment standards. These data were from pilot-scale and full-scale solvent extraction and incineration technologies, both of which are demonstrated, commercially available technologies for K048-K052 wastes. The specific methodology used to develop the revised BDAT treatment standards for nonwastewater forms of K048-K052 is discussed in detail in the Final Amendment to the BDAT Background Document for Wastes from the Petroleum Refining Industry, K048, K049, K050, K051, K052. The Agency may reevaluate and revise these treatment standards following promulgation of the Third Third rule, depending on the quality and quantity of additional treatment data which become available.

Comment Number: 48-Bie-1

Docket Number: LD12-L0039

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Nonwastewater BDAT Treatment Standards

Comment:

T/K recommends that EPA use the data base selected in this report as the basis for its revised BDAT standards for K048—K052 nonwastewaters. The Agency should also be prepared, however, to revise the BDAT standards once full-scale propane extraction, multi-stage extraction, and amine extraction processes are operating at multiple refineries.

Comment Number: 48-Bid-4

Docket Number: LD12-L0039.A

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Response:

The Agency is promulgating revised BDAT treatment standards for metal constituents in K048-K052 nonwastewaters. The revised standards were developed using several data sets for stabilization treatment of metal constituents in K048-K052 nonwastewater residuals, including two data sets submitted by industry and one set of data generated by the Agency. These data sets met the Agency's data quality screening criteria and were used in developing the revised standards.

None of the data submitted by industry show substantial treatment of arsenic and selenium. Additionally, the Agency acknowledges that only marginal evidence of treatment of arsenic and selenium is shown in the stabilization data generated by EPA. Therefore, the Agency is deleting the treatment standards for arsenic and selenium in nonwastewater forms of K048-K052.

Data submitted by industry indicated that the wastes tested by industry contained significantly higher concentrations of nickel than the wastes tested by the Agency. In order to account for the maximum variability of nickel concentrations in K048-K052 wastes, the Agency is revising the treatment standard for nickel using the data submitted by industry.

The treated waste data from the Agency-conducted stabilization test that were used to develop the treatment standard promulgated for chromium in K048-K052 nonwastewaters in the First Third rule were first adjusted for analytical recovery. Next, the Agency performed a statistical comparison of the untreated and treated waste and was able to establish that statistically significant treatment had occurred for chromium. (Prior to the statistical comparison, the Agency discounted the effects of dilution by the binders and the presence of metals in the binder materials.) Finally, a variability factor was used in the treatment standard calculation to account for variability in the treatment system and in the collection and analysis of treated waste samples. The stabilization data submitted by industry for chromium indicate that the treatment standard for chromium is achievable for the complete range of K048-K052 wastes tested using stabilization treatment. Therefore, the treatment standard for chromium remains as promulgated in the First Third rule.

Comment Number: 48-Bid-4

Docket Number: LD12-L0039.A

Commenter: American Petroleum Institute

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

EPA should use all of the available fixation data to establish the BDAT limits for metals.

additional data on stabilized FBI ash and solvent extraction residue demonstrate conclusively that EPA's standards for arsenic and nickel are *unachievable*; and

for some waste residues, demonstrating compliance with BDAT standards for metals may be hampered by the inability to achieve the low detection limits used by EPA as the basis for the standards.

Given the limited amount of data available on metals leaching from the fixed, treated, K048—K052 nonwastewaters, it is appropriate to use the *highest* 99th percentile concentration calculated from the two data sets (FBI ash, solvent extraction) as the basis for the BDAT limits on metals. Due to the demonstrated variability of metals in untreated K048—K052 nonwastewaters (*API Report*), it is inappropriate to establish the BDAT standards on the basis of the data from only a single treatment technology.

Comment Number: 48-Bid-3

Docket Number: LD12-00116

Commenter: Monsanto

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Response:

The Agency acknowledges the error made in the calculation of the treatment standard for nickel that was promulgated in the First Third rule.

Data submitted by industry indicated that the wastes tested by industry contained significantly higher concentrations of nickel than the wastes tested by the Agency. In order to account for the maximum variability of nickel concentrations in K048-K052 wastes, the Agency is revising the treatment standard for nickel based on the data submitted by industry. The BDAT treatment standard for nickel being promulgated in the Third Third rule is 0.20 mg/L in the TCLP leachate (maximum for any single grab sample).

The Agency acknowledges that commercial incinerators routinely mix wastes for the purpose of treatment. However, it is impossible for the Agency to take into account infinite permutations of mixing wastes when developing treatment standards. The commenter should be aware that, when mixing one regulated hazardous waste with one or more nonhazardous wastes, the entire resulting mixture is subject to the regulated hazardous waste's BDAT treatment standards. In addition, a mixture of two or more regulated hazardous wastes would be required to be treated to the most stringent (lowest concentration) treatment standard for each constituent regulated in any of the individual wastes.

The treatment standard for nickel in K015 nonwastewaters is being revised according to the change in the K048-K052 nickel standard. The revised treatment standard for nickel in K015 nonwastewaters is 0.20 mg/L in the TCLP extract (maximum for any single grab sample). Therefore, the mixing of K015 and K048-K052 would have no effect on the BDAT treatment standard for nickel that each waste would have been subject to individually.

Comment Number: 48-Bid-3

Docket Number: LD12-00116

Commenter: Monsanto

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

Based on the contractor data "API has calculated that these standards should be set at a minimum at... 0.247 mg/l for Nickel." (API Petition at page 22). This level is 5-times the proposed EPA standard for K048-052.

Monsanto strongly supports API's request that the Agency correct the deficiencies and recompute the K048-052 BDAT limits for Nickel - as well as the other constituents - using the additional information provided.

c. Nickel Levels in Commercial Incineration Residues Above K048-052 Levels

There is a further reason which supports the need for the higher K101/102 Nickel standard in the real world of commercial incineration. A common practice in such incineration facilities is to burn compatible and mixed wastes. This is also true for K015. The resultant residues become indistinguishable from the raw waste materials being burned at any given time.

Actual commercial experience at Rollins Environmental Services with solid residues from various incinerated mixed wastes gives background nickel levels similar to those computed for K015. Specifically, data based upon 21 different samples of mixed wastes gave Nickel concentrations of 460 ppm and ranged 16-2420. Obviously, the commingling of K015 which generates Nickel residue levels of the order of 1000 ppm would contribute further increases to the mixed residue levels above EPA's K048-052 levels of 51-80 ppm.

Comment Number: 48-Bid-3

Docket Number: LD12-00116

Commenter: Monsanto

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

"However, even if EPA recalculated and revised the nickel and arsenic standards appropriately, using its original data and methodology properly, they still would be unachievable in many instances because: (a) EPA's original decision was based on an extremely limited and unrepresentative set of refining waste samples; (b) there is a high degree of metallics variability in the universe of untreated refining wastes (both within a given facility over time and within the industry as a whole) not reflected by the data on which EPA relied; and (c) this variability in untreated wastes affects the effectiveness of treatment processes."

They support their position on the limitations of the EPA data on page 16:

"Since the data on which EPA relied in making its decision for non-wastewater metallics were derived from a handful of samples of wastes from one refinery on one day (i.e., a one day "snapshot" of one refinery's waste), it is not surprising that EPA's data fail to reflect the differences between untreated wastes in a refinery over time, much less the differences within the refining industry as a whole."

The API then summarizes their position regarding the EPA samples on page 21:

"In sum, the same refinery that provided the incinerator ash on which EPA based the treatment standards cannot achieve the standards even when using the same incinerator, the same type of waste feeds (mixed K048 and K051), the BDAT process prescribed by EPA, and the process conditions upon which the standards were based. It therefore seems highly likely that other companies with different waste feeds, equipment and processes will also be unable to consistently meet those never-to-be-exceeded standards."

Cont.

Comment Number: 48-Bid-3

Docket Number: LD12-00116

Commenter: Monsanto

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

b.1. Nickel Standard for K048-052 Set Inappropriately Low

In the development of the Nickel BDAT standard for K048-052, EPA incorrectly set the limit at 0.048 mg/kg. This is supported in an analysis of the BDAT document done by the American Petroleum Institute (API) and submitted to EPA on October 20, 1989[7]. (The letter of transmittal is included as Attachment H). They concluded that the Agency did not properly utilize their own procedures for determining the Variability Factor. If properly done using their data, the Nickel standard would be at least 50% higher.

EPA should not directly transfer an incorrectly determined BDAT limit for Nickel to the K015 waste.

b.2. Even the Recomputed K048-052 Nickel Limit Would be Unachievable

The API petition referenced above provides considerable additional data on K048-052 wastes which is detailed in their contractor's report[8] and summarized in their petition.

The API in their petition at Page 4 summarizes why the K048-052 Nickel (and arsenic) limits recomputed based on EPA's data would still be unachievable:

[7]"Petition For Reconsideration and Amendment of Land Disposal Treatment Standards for Certain Petroleum Refining Industry Wastes." API to William K. Reilly, 10/20/89.

[8]"Evaluation of BDAT Standards for Petroleum Refining Wastes Using New Waste and Treatment Data." Prepared for API by Tischler/Kocurek, October 1989.

cont.

Comment Number: 48-Bid-2

Docket Number: LD12-00098

Commenter: BP America

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Response:

The Agency acknowledges the error made in the calculation of the treatment standard for nickel that was promulgated in the First Third rule.

Data submitted by industry indicated that the wastes tested by industry contained significantly higher concentrations of nickel than the wastes tested by the Agency. In order to account for the maximum variability of nickel concentrations in K048-K052 wastes, the Agency is revising the treatment standard for nickel based on the data submitted by industry. The BDAT treatment standard for nickel being promulgated in the Third Third rule is 0.20 mg/L in the TCLP leachate (maximum for any single grab sample).

Comment Number: 48-Bid-2

Docket Number: LD12-00098

Commenter: BP America

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

compelled to require treatment of liquid waste containing 134 ppm nickel, allowing disposal of solid treatment residues which leach less than 0.07 ppm nickel should not pose a problem. Accordingly, BPA urges EPA to recalculate the K048-K052 BDAT limit for nickel to reflect BPA's December 22, 1989 data. The presence of less than 0.07 ppm nickel should not remain an obstacle to using BPA's process, especially in light of the current incineration-based BDAT limit of 1.7 ppm for chromium, a far more toxic metal than nickel.

The current BDAT limit for nickel is overly restrictive based on new data and should be increased to at least 0.072 ppm.

Comment Number: 48-Bid-2

Docket Number: LD12-00098

Commenter: BP America

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

Several reasons suggest that the current nickel limit should be raised to allow the use of multi-cycle SE to treat refinery waste. First, EPA made several mathematical and procedural errors when calculating the current standard for nickel. As explained fully in API's October 20, 1989 Petition to Administrator Reilly, even when using only incineration-based stabilization data, the level for nickel should be at least 0.072 ppm, not 0.048. 23/ Second, as explained in BPA's comments on the proposed First-Third rule, nickel is a relatively non-toxic metal. EPA's decision to not add nickel as an EP-toxicity parameter confirms this view. And lastly, EPA's decision to not lower the statutory limit of 134 ppm nickel for so-called "California wastes" further indicates that this metal is of little regulatory concern. Certainly, if EPA does not feel

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23/ API's petition points out similar errors for the current BDAT limit for arsenic. Table 2 indicates that achieving this limit with BPA's multi-cycle SE process may be difficult, but not as difficult as meeting the current BDAT limit for nickel.

Cont.

Comment Number: 48-Bid-1

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Response:

The Agency is promulgating revised BDAT treatment standards for metal constituents in K048-K052 nonwastewaters. The revised standards were developed using several data sets for stabilization treatment of metal constituents in K048-K052 nonwastewater residuals, including two data sets submitted by industry and one set of data generated by the Agency. These data sets met the Agency's data quality screening criteria and were used in developing the revised standards.

None of the data submitted by industry show substantial treatment of arsenic and selenium. Additionally, the Agency acknowledges that only marginal evidence of treatment of arsenic and selenium is shown in the stabilization data generated by EPA. Therefore, the Agency is deleting the treatment standards for arsenic and selenium in nonwastewater forms of K048-K052.

Data submitted by industry indicated that the wastes tested by industry contained significantly higher concentrations of nickel than the wastes tested by the Agency. In order to account for the maximum variability of nickel concentrations in K048-K052 wastes, the Agency is revising the treatment standard for nickel using the data submitted by industry.

The treated waste data from the Agency-conducted stabilization test that were used to develop the treatment standard promulgated for chromium in K048-K052 nonwastewaters in the First Third rule were first adjusted for analytical recovery. Next, the Agency performed a statistical comparison of the untreated and treated waste and was able to establish that statistically significant treatment had occurred for chromium. (Prior to the statistical comparison, the Agency discounted the effects of dilution by the binders and the presence of metals in the binder materials.) Finally, a variability factor was used in the treatment standard calculation to account for variability in the treatment system and in the collection and analysis of treated waste samples. The stabilization data submitted by industry for chromium indicate that the treatment standard for chromium is achievable for the complete range of K048-K052 wastes tested using stabilization treatment. Therefore, the treatment standard for chromium remains as promulgated in the First Third rule.

Furthermore, the Agency did not consider transferring stabilization data from another waste to K048-K052 for the purpose of developing treatment standards because multiple data sets are available from stabilization treatment of K048-K052, and the Agency believes it is more appropriate to use treatment performance data from the specific regulated waste, when available, to develop BDAT standards.

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Comment Number: 48-Bid-1

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

2. Metal Standards for KO48-KO52

Regarding the proposed metal treatment standards for K048 through K052 waste these are inappropriately based on the stabilization studies conducted on ash at the Vicksburg Waterways Experimental Station (See Docket No. LDR7-SO211). The HWTC members who operate incinerators are concerned that the nickel standard set for these wastes, and technology transferred to these wastes as well as to F024 and K028 are too low and non-achievable. A review of the Vicksburg stabilization studies indicate that the nickel standard for K048 through K052 waste was arrived at in an erroneous manner. It is true that the stabilized incinerator ash had TCLP leachate levels of 0.018 ppm nickel. However, the untreated waste feed in these studies had nickel levels in the range of non-detectable (<0.02 ppm) up to just slightly above the detectable limit (0.03 ppm). Therefore, no treatment for nickel was demonstrated in these stabilization studies. In fact, nickel wasn't even present in the waste to begin with.

As an alternative, the HWTC urges EPA to technology transfer the metal treatment standards from F006 and the D code waste data provided by our members in comments made on the third thirds to K048 through K052 waste and F024 and K028 waste. The F006 stabilization treatment standards have already been used in setting treatment standards for incinerator ash from K001, K022, K087, K101 and K102 in the first thirds, and from K115, K011, K013 and K014 waste in the second thirds. Incineration facilities would like to have one consistent compliance standard to meet for each metal, regardless of the waste code.

The chromium standard for K048-K052 stabilization studies is also invalid. As in the case of nickel, very little chromium was present in the untreated waste, which ranged in chromium concentration from 2.1 to 2.6 ppm. The treatment standard of 1.7 ppm shows no significant reduction in chromium.

For these reasons, the HWTC urges EPA to not use the invalid stabilization studies conducted at Vicksburg, to set treatment standards for incineration ash in the future. The treatment standards for metals in F024, K028, K048 through K052, and all standards for stabilization of metals in ash from incinerating metal bearing waste should be based on the F006 stabilization studies and data provided by our members for D metal bearing wastes. These studies were valid because the untreated waste did contain significant levels of metals, and stabilization was therefore well demonstrated to recuce the mobility of metal constituents.

Comment Number: 48-Bid-1

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

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cont.

Comment Number: 48-Bid-1

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Nickel and Chromium Standards

Comment:

Regarding the proposed metal treatment standards for K048 through K052 waste these are inappropriately based on the stabilization studies conducted on ash at the Vicksburg Waterways Experimental Station (See Docket No. LDR7-SO211). The HWTC members who operate incinerators are concerned that the nickel standard set for these wastes, and technology transferred to these wastes as well as to F024 and K028 are too low and non-achievable. A review of the Vicksburg stabilization studies indicate that the nickel standard for K048 through K052 waste was arrived at in an erroneous manner. It is true that the stabilized incinerator ash had TCLP leachate levels of 0.018 ppm nickel. However, the untreated waste feed in these studies had nickel levels in the range of non-detectable (<0.02 ppm) up to just slightly above the detectable limit (0.03 ppm). Therefore, no treatment for nickel was demonstrated in these stabilization studies. In fact, nickel wasn't even present in the waste to begin with.

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cont.

Comment Number: 48-Bic-2

Docket Number: LD12-L0026/LD12-L0037

Commenter: CF Systems

Issue: K048-K052

Subissue: Ethylbenzene and Phenanthrene Standards

Response:

The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052. However, the Agency acknowledges that some of these units may require process adjustments.

The Agency points out that none of the revised treatment standards for organic constituents in nonwastewater forms of K048-K052 were proposed or are being promulgated at levels below the PQLs for their respective constituents as listed in SW-846 for low level soil, the most similar matrix to incinerator ash and solvent extraction residues of the four matrices for which PQLs are given. In addition, the commenter should keep in mind that the PQLs in SW-846 were established to provide guidance for the analysis of waste samples by establishing minimum performance criteria for analytical laboratories. The PQLs listed in SW-846 do not necessarily represent the lowest limits of analytical performance achievable for any given waste. The PQLs the commenter refers to were obtained from analyzing a non-K048-K052 incinerator ash. The treatment standards for all regulated organic constituents in nonwastewater forms of K048-K052 are based on data submitted by industry and the Agency believes that both solvent extraction and incineration technologies can reliably meet these standards on a routine basis.

Comment Number: 48-Bic-2

Docket Number: LD12-L0026/LD12-L0037

Commenter: CF Systems

Issue: K048-K052

Subissue: Ethylbenzene and Phenanthrene Standards

Comment:

CF Systems recommends that the Agency not finalize the proposed standard for K048-K052 as proposed in the third-third rule because it is based only on a fraction of the total data available and because the standards for ethyl benzene and phenanthrene are clearly below the practical quantitation limits for those two constituents.

Comment Number: 48-Bic-1

Docket Number: LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Ethylbenzene and Phenanthrene Standards

Response:

The Agency points out that none of the revised treatment standards for organic constituents in nonwastewater forms of K048-K052 were proposed or are being promulgated at levels below the PQLs for their respective constituents as listed in SW-846 for low level soil, the most similar matrix to incinerator ash and solvent extraction residues of the four matrices for which PQLs are given. In addition, the commenters should keep in mind that the PQLs in SW-846 were established to provide guidance for the analysis of waste samples by establishing minimum performance criteria for analytical laboratories. The PQLs listed in SW-846 do not necessarily represent the lowest limits of analytical performance achievable for any given waste. The PQLs the commenter refers to were obtained from analyzing a non-K048-K052 incinerator ash. The treatment standards for all regulated organic constituents in nonwastewater forms of K048-K052 are based on data submitted by industry, and the Agency believes that both solvent extraction and incineration can reliably meet the standards on a routine basis.

Comment Number: 48-Bic-1

Docket Number: LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Ethylbenzene and Phenanthrene Standards

Comment:

The Council recommends that the Agency not finalize the proposed standard for KO48-K052 as proposed in the third-third rule because the standards for ethyl benzene and phenanthrene are clearly below the practical quantitation limits for those two constituents.

Comment Number: 48-Bib-1

Docket Number: LD12-00098

Commenter: BP America

Issue: K048-K052

Subissue: Benzo(a)pyrene Standard

Response:

The revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052 were developed using four sets of solvent extraction data and one set of incineration data. Three of the data sets considered were submitted by industry and two were generated during treatment tests conducted by the Agency. These data sets met the Agency's data quality screening criteria and were used to develop the promulgated standards. The general methodology followed by the Agency in calculating the revised promulgated treatment standards for organic constituents in nonwastewater forms of K048-K052 is described below.

The five data sets considered were reviewed to determine the most difficult to treat waste (typically containing the highest concentration value) for each regulated constituent. The corresponding treated waste value was then used to calculate the treatment standard for each constituent. In this manner, the entire range of variability for each constituent in untreated K048-K052 wastes was accounted for in calculating the revised BDAT treatment standards. Following a detailed analysis of all of the solvent extraction treatment data available for K048-K052 wastes, the Agency believes that most solvent extraction units will be able to meet the revised BDAT treatment standards for organic constituents in nonwastewater forms of K048-K052. However, the Agency acknowledges that some of these units may require process adjustments.

Based on the methodology described above, the treatment standard for benzo(a)pyrene is being revised from 0.84 ppm (promulgated in the First Third rule) to 12 ppm.

TABLE 1

EXISTING, PROPOSED, AND CALCULATED BDAT LIMITS USING VARIOUS SOLVENT EXTRACTION DATA SETS

	Current Limits	Proposed Limits	Calculated Limits		
			RCC */	CF */	BPA **/
Benzene	9.5	3.9		2.7	
Toluene	9.5	3.9		4.1	
Xylenes	-	8.5		7.5	99
Ethylbenzene	67	0.08		6.3	
Naphthalene		0.84	210	33	110
Anthracene	6.2	1.4	100	84	6.2
Phenanthrene	7.7	0.84	230	73	7.7
Benzo(a)anthracene	1.4	1.4	40	18	1.4
Chrysene	2.2	0.84	23	13	2.2
Pyrene	2.0	1.1	44	29	2.0
Benzo(a)pyrene	0.84	1.4	31	7.1	1.4
o-cresol	2.2	6.8		6.0	
p-cresol	0.9	6.8			
Phenol	2.7	4.3		3.8	
Cyanide	1.8				
di-(n-butyl)phthalate	4.2	4.3			
bis(2-ethylhexyl)phthalate	37	4.3		11	4.2
					37

*/ Calculated BDAT limits for RCC's and CF's processes excerpted from letters to James Berlow from Mark Tose (Nov. 27, 1989) and to Jerry Vorsach from Richard de Filippi (Nov. 7, 1989), respectively.

**/ Calculated BDAT limits for BPA's process for xylene, naphthalene and benzo(a)pyrene derived according to EPA's methodology for calculating BDAT limits (except the recovery correction step) as set forth in the August 8, 1988 K048-K052 BDAT background document. For the remaining constituents, the current BDAT limits are provided, which are based on BPA's data submission on the First-Third rule and which Table 2 illustrates BPA's multi-cycle SE process can meet.

Comment Number: 48-Bib-1

Docket Number: LD12-00098

Commenter: ~~K048-K052~~ BP America

Issue: ~~Benzo(a)pyrene Standard~~ K048-52

Subissue: Benzo(a)pyrene Standard

Comment:

The current limit for BaP is 0.84 ppm, the lowest BDAT level for organic constituents in refinery waste. Although BPA's multi-cycle process is designed to specifically remove highly toxic PNAs, BPA's December 22, 1989 data illustrate that consistently achieving the current BaP limit will be problematic. The proposed Third-Third rule, however, would increase the BaP limit from 0.84 to 1.4 ppm (to accommodate C.F. Systems' unit). Although Table 1 indicates that C.F.'s process cannot achieve the proposed revised standard, BPA's can. Thus, BPA requests that EPA retain this aspect of the proposed rule in the final Third-Third regulations.

The proposed limit for benzo (a) pyrene (BaP) of 1.4 ppm should be finalized.

Cont.

Comment Number: 48-Bia-4

Docket Number: LD12-00172/LD12-L0014

Commenter: Hazardous Waste Treatment Council

Issue: K048-K052

Subissue: Xylene and Naphthalene Standards

Response:

(Continued)

conflicting claims from the treatment industry regarding the equivalency of performance of three-pass and five-pass solvent extraction technology. The industry itself participated in research efforts regarding treatment tests on some of the more contaminated petroleum wastes and generated some useful data which were used in revising the promulgated standards.

The result of this involved process is that it could have been reasonably unclear to a petroleum facility whether treatment standards could be achieved using solvent extraction technology. Such a facility could have legitimately delayed its investment decision about what treatment technology to use to comply with the land disposal prohibitions. Given this situation, the Agency believes it is acting both reasonably and legally in exercising its authority to reschedule the wastes to the Third Third.

The Agency has determined that currently there is inadequate treatment capacity for generated K048-K052 wastes. The Agency expects the additionally needed treatment capacity to become available in the next six months (see Section III.b of the preamble for the promulgated Third Third Rule). Thus, the Agency is granting a six-month national capacity variance for K048-K052 wastes. The revised standards for organic and metal constituents in K048-K052 nonwastewaters and for cyanide in K048-K052 wastewaters and the previously promulgated standards for organic and metal constituents in K048-K052 wastewaters and cyanide in K048-K052 nonwastewaters will become effective on November 8, 1990, at the completion of the six-month capacity variance being issued for K048-K052 as part of the Third Third rule.